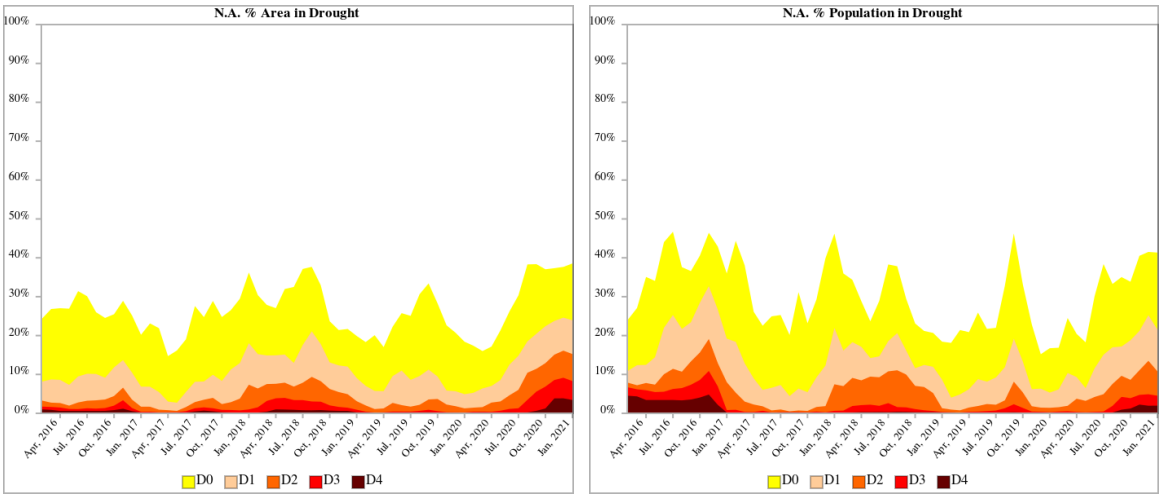
North American Drought Monitor – January 2021

At the end of January 2021, moderate to exceptional drought (D1-D4) affected 23.8% of the area and 21.4% of the population of North America. The percent area value was 0.7% less than the value for the end of December 2020. The percent population value was 3.7% less than the value for the end of December. At the end of January, 93.8% of the Rio Grande/Bravo River Basin and 58.6% of the Great Plains were in moderate to exceptional drought, 27.3% of the Columbia River Basin was in moderate to extreme drought (D1-D3), and 1.7% of the Great Lakes Basin was in moderate drought. The North American Great Plains extends across the United States and into adjacent parts of northeast Mexico and the southern Prairies of Canada. The percent area values for the Great Plains and all of the river basins decreased compared to the end of December.



Percent area (left) and percent of the population (right) of North America in drought, February 2016-January 2021.

CANADA

The majority of Canada experienced a warmer and drier than normal January. Large portions of the country experienced temperatures greater than 5 degrees Celsius above normal. Below-normal precipitation was received throughout the majority of the country with southern portions of British Columbia being the only notable exception. As a result of the warm, dry conditions, drought extent and severity increased in all previously identified dry regions.

In British Columbia, normal to above-normal precipitation was received in most parts of the province and only a small portion of the Peace River region and the southeastern Rockies remained Abnormally Dry (D0). January conditions throughout the Prairie region predominantly consisted of well above-normal temperatures, well below-normal precipitation, and high winds resulting in expanded and deepening drought conditions across Saskatchewan and Manitoba, as well as the formation of new drought regions in

Alberta. The lack of precipitation carried into northwestern Ontario led to the expansion of Moderate Drought (D1) and the emergence of Severe Drought (D2) in the region. Southern Ontario and Quebec faced dry conditions where previously reported, resulting in expanded Abnormally Dry (D0) and Moderate Drought (D1). The Atlantic region saw only minimal changes to D0 conditions and remained drought-free, barring a small D1 in Newfoundland. Conditions in northern regions of the country remained fairly consistent and resulted in only small expansions of Abnormally Dry (D0) conditions and the removal of drought. Approximately nineteen percent of the country was considered Abnormally Dry (D0) or in drought; this includes about forty-six percent of the agricultural landscape.

Pacific (BC)

Above-normal precipitation through much of British Columbia resulted in no change to the drought assessment. British Columbia continued to be drought-free with only two limited areas of Abnormally Dry (D0) conditions remaining. A small pocket of D0 conditions persisted near the Alberta border from Tumbler Ridge to Dawson Creek and from Cranbrook to Brisco; these remained in place as precipitation percentiles showed below-normal accumulations over the last two to three months. Short-term dry conditions have been developing in the Prince George and Kelowna-Penticton-Vernon areas, however these regions received adequate moisture before freeze-up thus alleviating current concerns for drought. As a result, these areas will continue to be monitored for any potential drought development in the coming months. The remainder of the province saw mostly near-normal precipitation and normal to above-normal streamflow values throughout January. Only two and a half percent of the province was considered to be Abnormally Dry (D0), which accounts for approximately seven percent of the agricultural landscape.

Prairies (AB, SK, MB)

Continued dry conditions throughout January led to further development of drought across the Prairies. Minimal precipitation in December and January across central areas of Alberta led to a slight degradation of conditions both northwest, south, and east of Edmonton. Although parts of central Alberta received more than ample precipitation during the growing season in 2020, some areas did not have adequate soil moisture going into freeze-up which led to the expansion of Abnormally Dry (D0) conditions. For this reason, Abnormally Dry (D0) conditions expanded and a small pocket of Moderate Drought (D1) was added northwest of Edmonton, including the communities of Edson and Whitecourt. This particular area experienced precipitation below the 10^{th} percentile over the last six months and below-normal precipitation in the past 90 days. Similar conditions of minimal precipitation stretched towards the Peace Region of Alberta into northeastern B.C. In southern Alberta, Abnormally Dry (D0) conditions persisted southwest of Calgary. This pocket expanded slightly south towards Pincher Creek to account for significantly dry conditions in the past two months. A pocket of D0 was also added south of Medicine Hat to include Milk River. Given the lack of snow cover and potential for increased evapotranspiration, southern Alberta will be monitored for further drought development in the coming months. Parts of central Saskatchewan received slightly below-normal precipitation going into winter, however adequate snowfall has recovered this moisture deficit; Saskatoon was removed from Abnormally Dry (D0) conditions as a result. The

pocket of D0 surrounding La Ronge was reduced slightly for this reason as well and D0 was removed altogether from the area surrounding Meadow Lake. Abnormally Dry (D0) conditions and drought expanded slightly across southern Saskatchewan as short-term moisture deficits develop on top of previously reported long-term impacts. A small expansion of Moderate Drought (D1) westward towards Swift Current occurred as a result of both short and long-term lack of precipitation. Precipitation percentiles for the past two and six months show that moderately low precipitation, below the 20th percentile, was received in this area. The area in Severe Drought (D2) across parts of Saskatchewan and Manitoba expanded to include both Weyburn and Moose Jaw; these communities experienced long-term dryness for the past six months, classified as precipitation below the 5th percentile. Drought in Manitoba remained relatively unchanged. Moderate Drought (D1) and Severe Drought (D2) continued to cover much of the southern part of the province as a lack of precipitation in both the short- and long-term indicated drought. About thirty-five percent of the Prairie region was classified as either Abnormally Dry (D0), in Moderate Drought (D1) or in Severe Drought (D2); this includes nearly sixty percent of the region's agricultural landscape.

Central (ON, QC)

Minimal precipitation throughout the month of January worsened drought and Abnormally Dry (D0) conditions in parts of the central region, particularly in northwestern Ontario as well as southern Ontario and Quebec. Due to below-normal precipitation in northwestern Ontario over the last three months, an increase in Moderate Drought (D1) occurred near Rainy Lake; this area of D1 now spans from Lake of the Woods northeast to Osnaburgh House. A small pocket of D1 also remained southwest of Thunder Bay. Abnormally Dry (D0) conditions persisted through the northwest, with a slight expansion of D0 towards Red Rock. Severe Drought (D2) also emerged in the area surrounding Sioux Lookout and Dryden as precipitation was 50 to 75 percent below-normal in the last three months. These expansions come as precipitation percentiles show the area as receiving below-normal precipitation throughout the agricultural year. In southern Ontario, additions and expansions to Abnormally Dry (D0) conditions were seen as well. Along the coast of Georgian Bay, an area from Elliot Lake to Parry Sound received between 20 to 50 percent below-normal precipitation in the last 90 days as well as minimal Snow Water Equivalent moisture; this led to the formation of an Abnormally Dry (D0) pocket. Areas of Abnormally Dry (D0) conditions that were previously reported along the southern tip of Ontario were expanded to include the area between La Salle in the south to Peterborough in the north; the pocket near Niagara Falls remained unchanged. This region received 10 to 25 percent below-normal precipitation in the past three months. Minimal expansions of D1 around Sherbrooke and St-Jean-sur-Richelieu took place in January as well. According to precipitation percentiles for the past 60 and 90 days, this area received precipitation below the 20th percentile. Abnormally Dry (D0) conditions also extended further north due to 25 to 50 percent below-normal precipitation reported in the last three months. Nearly sixteen percent of the Central region remains Abnormally Dry (D0), in Moderate Drought (D1) or in Severe Drought (D2); this includes approximately thirty-three percent of the agricultural landscape.

Atlantic (NB, NS, PEI, NL)

In January, minimal changes were made to Abnormally Dry (D0) conditions. However, a pocket of Moderate Drought (D1) emerged in Newfoundland. In New Brunswick, a small pocket of D0 remained but was reduced slightly between Fredericton and Saint John due to near to above-normal precipitation in the last three months; the equated to precipitation above the 40th percentile. The Abnormally Dry (D0) conditions on Prince Edward Island remained, though slightly expanded further east to include Charlottetown, as streamflow and satellite-derived data showed precipitation well below-normal in the last three months. Most conditions remained the same across Nova Scotia, barring a slight expansion of Abnormally Dry (D0) conditions. As identified within 90-day satellite-derived data, below-normal precipitation northwest of Liverpool led to dry conditions in southern Nova Scotia. D0 conditions now cover a greater area of Cape Breton Island including the area surrounding Inverness. This area received only 60 to 85 percent of normal precipitation both in January and in the past three months. Newfoundland also saw an expansion of D0 across much of the island, excluding St. John's. A small area of Moderate Drought (D1) was also added around Pasadena due to significantly low precipitation in January and over the long-term; less than 40 percent of normal precipitation fell in the last month. Twenty-four percent of the Atlantic region is classified as Abnormally Dry (D0) or in Moderate Drought (D1); this includes close to thirty-four percent of the region's agricultural landscape.

Northern (YT, NWT)

Conditions in Northern Canada remained relatively similar to last month. A large area of Abnormally Dry (D0) conditions persisted in northern Yukon and Northwest Territories as 25 percent below-normal precipitation was identified in the last three months. There were slight expansions of D0 near Beaver Creek, Yukon, as well as the area from Yellowknife to Hay River, NWT; this could be attributed to below-normal precipitation in the last three months. The Northern region is now considered drought-free as improved precipitation around Old Crow led to both the removal of Moderate Drought (D1) and a reduction in D0 conditions. Approximately fifteen percent of the Northern region is classified as Abnormally Dry (D0).

UNITED STATES

Perhaps the biggest drought story of January was the improvement of conditions across the southern Plains, particularly Texas, due to several storm systems traversing the region. Other notable improvements occurred in the Pacific Northwest and the central Hawaiian Islands. Degradations in drought conditions were less dramatic, but necessary in some areas as precipitation deficits continued to accumulate. Much-above-normal temperatures and a lack of snowfall contributed to worsening conditions in the northern Rockies and northern Plains. Overall, over the course of the month, drought conditions improved slightly nationwide, with nearly 55% of the U.S. and Puerto Rico experiencing drought or abnormal dryness (D0-D4).

Drought Outlook

The Climate Prediction Center's monthly drought outlook for February indicates that drought will persist across much of the West, the Plains, northern Puerto Rico, and small pockets of the Northeast. Further development is likely in the southern Plains and the Southeast, from Texas eastward to Florida, as well as coastal areas of Georgia and South Carolina. Meanwhile, drought conditions are expected to improve or be removed in portions of Oregon and California, Hawaii, and pockets of Illinois, Indiana, Tennessee, and Mississippi.

Temperatures

Northern portions of the contiguous U.S. were quite warm in January, with temperature departures ranging from 3-12°F above normal. The highest departures could be found in northern Montana, much of North Dakota, northern South Dakota, northwestern Minnesota, and northern Maine. The following states ranked among the top 10 warmest Januarys: North Dakota (3rd), South Dakota (5th), Maine and Minnesota (6th), and Montana (9th). Areas of the Southwest experienced near to slightly below normal temperatures; otherwise, temperatures were near to slightly above normal across the rest of the CONUS. January temperatures were generally above normal in Alaska and Hawaii, while temperatures varied across Puerto Rico.

Precipitation

For the most part, the contiguous U.S. was dry in January. The Florida Peninsula was especially dry, receiving less than 50% of normal precipitation. Portions of the northern Plains were also quite dry and have experienced a below-normal snowfall season thus far. On a state level, however, the states ranking driest relative to the 1895-2021 period were Michigan, which had its 12th driest January, followed by New Jersey and Pennsylvania, which both had their 13th driest. In contrast, January precipitation was 150-400% of normal in a swath from eastern Nebraska southward through central Texas, due to multiple storm systems bringing heavy rain and/or snow to these areas. Puerto Rico was on the dry side in January, while precipitation departures varied across Alaska and Hawaii.

Northeast

January was warm and dry for the Northeast region. Moderate drought (D1) expanded slightly in northern portions of New York, Vermont, and New Hampshire. However, abnormally dry conditions (D0) were removed in portions of central Pennsylvania in early January, as this area received enough precipitation to erase short-term deficits. Overall, though, the depiction of drought in the Northeast changed very little in January.

Southeast

The Southeast was also warm in January, with dry conditions throughout the region except for along the Atlantic Coast, where precipitation was largely above normal. Heavy rains led to the removal of D0 across much of central Georgia. However, pockets of dryness

appeared in northern and western Alabama as well as northern Georgia/southwestern North Carolina, and existing areas of D0 in Florida and Alabama expanded. D1 was introduced to a small area in south-central Alabama, where precipitation deficits continued to mount.

South

The South region experienced huge improvements in drought conditions during January, as the percent area experiencing drought (D1-D4) decreased from 46% to 25%. Two large winter storms that moved through the region in early January were primarily responsible for the dramatic improvement in conditions. Improvements were most drastic in Texas, as central portions of the state improved by three classes throughout the month. Drought conditions also improved in several areas of Oklahoma, as well as across Arkansas, where D1 was removed and D0 was eradicated across much of the state. However, some areas of the region were not impacted by these winter storms, and instead were rather dry. Areas experiencing degradations included central and eastern Tennessee, where D0 was introduced; coastal Louisiana, where D1 developed; and northwestern Mississippi, where a small area of existing drought slightly expanded and intensified.

Midwest

Welcomed moisture brought improvements in drought conditions to many areas of the Midwest. Precipitation in the form of both rain and snow fell across northern Missouri and central Illinois during the early part of the month, resulting in the reduction of severe drought (D2), D1, and D0 in Illinois and the complete removal of D1 in Missouri. Later in the month, heavy snow led to the trimming of D2 and D1 conditions in western Iowa, while heavy rain prompted the removal of D0 from southern Kentucky. Despite these wet conditions, persistent dryness led to the expansion of D1 in eastern Illinois, as well as a broad introduction of D0 to northwestern Wisconsin.

High Plains

The High Plains were warm in January, particularly in the Dakotas, with dryness present throughout much of the region except for eastern portions of Nebraska and Kansas, which were very wet. Drought conditions slowly intensified throughout the course of the month in northern Wyoming, western South Dakota, and southwestern North Dakota after these areas continued to miss out on precipitation. These areas either degraded from D1 to D2 or from D0 to D1. Meanwhile, several areas experienced improvement in conditions. Heavy rain and snow chipped away at drought in southeastern Kansas so that much of this part of the state was free of drought and abnormal dryness by the end of the month. Eastern Nebraska also received heavy snow at the end of the month, improving conditions there. The pocket of extreme drought (D3) in eastern North Dakota was removed because several indicators were no longer supporting that depiction.

West

Above-normal temperatures continued into January for northern portions of the West, particularly across Montana, while temperatures throughout the rest of the region were

generally within a few degrees of normal. Pockets of wet and dry conditions were scattered across the region. D0 and D1 conditions both spread throughout Montana, and conditions worsened in southern Nevada and eastern California, as exceptional drought (D4) expanded across this area. However, some areas received notable improvement, particularly in the Pacific Northwest where several storms traversed the region throughout the month. Central Arizona received enough snow in higher elevations to improve from D4 to D3, and a boost in snowpack improved conditions in the Rockies in southern Colorado as well.

Alaska, Hawaii, and Puerto Rico

D0 was introduced in two areas of eastern Alaska in January, as warm and dry conditions continued to negatively impact snowpack. Meanwhile, D0 was removed from Kodiak Island, thanks to above-normal precipitation. In Hawaii, drought and abnormally dry conditions slowly intensified on Kauai, Oahu, Molokai, Maui, Kahoolawe, and the Big Island during the first couple weeks of January. Then, heavy precipitation brought improvements mostly to Oahu, Molokai, Lanai, Maui, and Kahoolawe. As for Puerto Rico, continued dryness prompted the spread of D0 across much of the northern part of the island, and D1 expanded along the northern coast as well. However, localized precipitation improved conditions in the central part of the island.

MEXICO

Much-needed rain fell in January on the northwest, one of the hardest drought hit regions. Above-average rainfall was also observed in the eastern corridor of the country, mainly over Veracruz, Tabasco and southern Yucatan Peninsula. These precipitation events were due to the influence of an atmospheric river event, trough lines, 3 winter storms, and 9 frontal systems during the month. In the rest of the country, precipitation continued to be low, mainly in the central regions and towards the central-west. Due to the subnormal precipitation, the moderate to severe drought (D1 to D2) increased in the states of Durango, Zacatecas, Jalisco and Michoacán. Over the Mexican South Pacific, the moderate to extreme (D1 to D3) drought remained with minimal changes. As of January 31, 2021, drought area from moderate to exceptional (D1 to D4) at the national level was at 57.64%, an increase of 2.6% with respect to the drought assessment of December 31, 2020. The 23.7 mm of rainfall at the national level in January was 5.1% below the January´s long-term average (1941-2020), which is of 24.9 mm, ranking in the central part of the historical data (the 47th driest January). The national mean temperature of 16.43 degree Celsius was 0.3 degree Celsius below the January's average, also in the middle part of the historical data, as the 38th coldest January, according to temperature records since 1953. For second month in a row, the country had below-average temperatures. During the month, forest fires were detected in at least 21 states that in total burned around 3,782 hectares; of the fires, Chihuahua, Michoacán, the State of Mexico, and Chiapas are the states with the largest burned area in the period from January 1 to February 4, according to data from the National Forestry Commission (CONAFOR). As of January 26, the dams of 11 basins or hydrological systems were below average to date, with systems more than 10% below the average located in the central and northern regions of the country. Meanwhile, 4

hydrological systems were close to the average, and five systems reported above-average storage, according to National Water Commission (CONAGUA) data.

Northwest or North Pacific (Baja California, Baja California Sur, Sonora, Sinaloa, Nayarit): These states cover approximately 21% of the national territory. Overall, the moisture produced by winter systems was most evident in the states of Baja California and Sonora between November and March, while the rest of the region received moisture from the Pacific, mainly from the jet stream. Rainfall over Baja California and Sonora and were associated with the important wetness contribution from an atmospheric river, three winter storms and four cold fronts. The needed wetness helped to slightly decrease the areas with extreme drought (D3) in Sonora. Between January 24 and 27, light snowfalls were reported in Baja California and Sonora that forced highway operations on the main roads of the region. Consequently, the temperature was below average in Sonora and Sinaloa, and slightly warmer than average in most of the Baja California Peninsula.

Northern (Chihuahua, Coahuila, Durango, Zacatecas and San Luis Potosí): These states make up 33.4% of the country's land area. Chihuahua received wetness in the form of rain and light snowfalls from the atmospheric river and the winter storms that resulted in a reduction in severe drought (D2). The rest of the northern states did not receive enough wetness, so drought continued with minimal changes. Temperatures were cooler in most of Chihuahua, Durango and northern Coahuila, the rest had above-average temperatures, in fact, San Luis Potosí recorded its third warmest January. In Chihuahua, a decrease has been reported in the area sown to winter crops (mainly oats and wheat).

Northeast (Nuevo León and Tamaulipas): This region accounts for 7.3% of the national territory. Minimal rainfall fell in the northeast, leaving drought areas virtually unchanged. Nuevo León and Tamaulipas recorded their 12th and 14th driest November to January period, respectively. Temperatures were warmer than normal in both states, Nuevo León had fewer than five frost days in the month, while temperatures did not drop below zero degrees Celsius in Tamaulipas.

Central-West (Aguascalientes, Jalisco, Guanajuato, Colima and Michoacán): These states represent 9.3% of the national territory. This region did not receive significant rainfall in the month and the areas with drought had little increase. Michoacán was the state in the lowest balance, recording their seventh driest January and their fourth driest November to January period. Meanwhile Colima and Guanajuato recorded their 8th and 13th driest November to January, respectively. In addition to the lack of rainfall, temperatures were warmer than average, especially on the coasts of Jalisco and Colima. The lack of rainfall is beginning to worry farmers in the Bajío area of Guanajuato. Agricultural authorities of that state reported a reduction in the sowed area in the fall-winter season due to low levels of reservoirs in the region, and this scenario could be repeated at the beginning of the spring-summer season is the rains continued to be low in the following months, but there also could have impacts on livestock.

Central-South (Querétaro, Hidalgo, State of Mexico, Tlaxcala, Puebla, Morelos and Mexico City): This region represents 5.2% of the national territory. Due to the absence of rains, conditions continued to deteriorate in the State of Mexico. Reservoirs in the

Cutzamala continue to have low levels due to scarce summer rainfall, which could lead to restrictions on water use. The Cutzamala System transports water from Michoacán (where it begins), passing through the State of Mexico to reach Mexico City; it is 322.32 kilometers long and is currently the system responsible for supplying drinking water to more than 21 million inhabitants in the country's capital. As of January 31, the state of Mexico and Michoacán have 42.9 and 40% in moderate to severe drought (D1-D2), respectively; figures practically equal to those diagnosed on the past December 31.

Gulf of Mexico (Veracruz and Tabasco): These states along the Gulf of Mexico constitute 4.8% of the country's land area. Thanks to the influence of frontal systems, sufficient rainfall was received from central to southern Veracruz and Tabasco, so that, a slight decrease in abnormally dry conditions was observed in the central region of Veracruz. The rains in Tabasco have decreased in intensity compared to previous months, but they have been enough to keep out drought-free, although temperatures have remained warmer than average in the two states.

South Pacific (Guerrero, Oaxaca and Chiapas): These states comprise 11.9% of the national territory. Guerrero and Oaxaca represent another drought core. Without rainfall on Guerrero and Oaxaca coasts, there were no recovery in the dry areas, instead only the southern coast of Chiapas received above-average rainfall. Temperatures were warmer than normal on the coasts of Guerrero and Oaxaca and the entire state of Chiapas, so the situation in the central region of Chiapas could begin to deteriorate in the following months.

Yucatán Peninsula (Campeche, Quintana Roo and Yucatán): It comprises 7.1% of the national territory. Above-average rains were observed in the eastern part of this region, mainly in eastern Campeche and Quintana Roo, although the northern and western portions of the Peninsula had below-average rains. Temperatures have been well above average in these states, so the danger of wildfires is returning.